

How Did You Finish the Problem?

Students are working on *Student Activity Book* page 19. On this page, students consider how to create an easier multiplication problem by rounding one factor up to a multiple of 10 and then adjusting their answer to solve the original problem. As the teacher is circulating and talking to students about their work, she notices that Andrew has written the following solution to Problem 1a, 15×29 :

$$10 \times 30 = 300$$

$$5 \times 30 = \underline{+150}$$

$$450 - 15 = 435$$

Teacher: Andrew, why did you choose to subtract 15?

Andrew: You only need to multiply fifteen 29 times, but Sophia multiplied it 30 times. So I took away the extra 15.

Teacher: Can you explain it to me in relation to the number of oranges in each box and the total number of boxes?

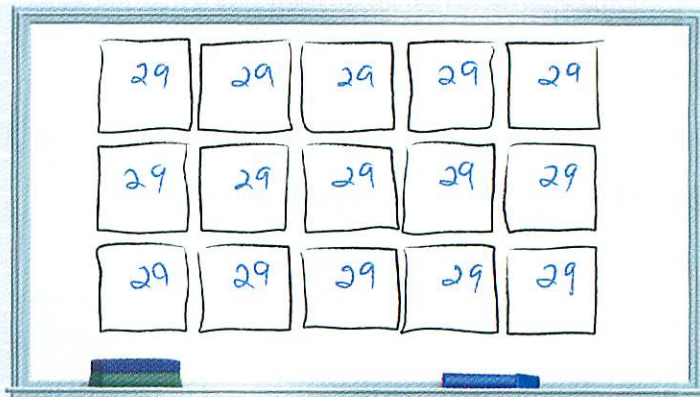
Andrew: I'm not sure.

Teacher: Let me ask you another question. How did you know to subtract 15 instead of 29?

At this point, Anna, his partner, joins in and so does Jake, who is sitting across from him.

Anna: Maybe we could read the story again and draw a picture.

As Andrew reads each sentence, Jake draws a picture. He draws 15 “boxes” and writes “29” inside each box.



Teacher: So here are the 15 boxes with 29 oranges in each that the class sold. What could you do to this picture to show what happened when Sophia multiplied 15 times 30?

Anna: She added one orange to each box. [Jake writes “+1” in each box.]

Andrew: She added 1 to each box to make it 30, so she has to minus 1 from each box, and she had 15 boxes so she subtracted 15.

Although Andrew was able to finish the problem correctly by subtracting 15, the teacher asks him to explain why this works and gives him the opportunity to represent his thinking. Asking these questions serves 2 purposes. First, Andrew thinks through his solution. Justifying his solution in terms of the story context helps him solidify his own thinking and helps the teacher make sure that he is not carrying out some steps patterned on poorly understood manipulation of the numbers. She poses the question “How did you know to subtract 15 instead of 29?” because she knows that some of her students, when they see that this method involves rounding and then subtracting, may try to just carry out these steps without thinking through what the numbers mean. Second, the picture created by the students provides a basis for discussion that will help others in the class visualize the meaning of changing one of the numbers in the problem.